

REMARKS

This paper is filed in response to the Office Action mailed on July 14, 2004.

In the Office Action, claim 18 is objected to. In response, claim 18 has been amended to make it dependent to claim 17.

Claims 1, 3, 7-8 and 18-20 have been amended; claims 1-20 remain pending.

Turning to the rejections based upon the prior art, the Patent Office rejects claims 1-4, 11, 12 and 15 under 35 U.S.C. §102(e) as allegedly anticipated by U.S. Patent No. 6,746,925 ("Lin"). In response, claim 1 has been amended to traverse this rejection. Specifically, claim 1 now requires a hard mask to be formed on top of the gate pattern which, leads to the requirement that the oxide film is formed to the size of the conductive layer of the gate pattern and not on top of the hard mask. See Figs. 1B and 1C of the present application.

Lin, in contrast, clearly does not satisfy the requirements of MPEP §2131 because it does not disclose the formation of a hard mask on a gate pattern or the formation of an oxide film on the sides of the conductive layer or the gate structure 206 without the formation of oxide material on a hard mask, which is not shown in Lin.

Accordingly, under MPEP § 2131,

[t]o anticipate a claim, the reference must teach every element of the claim. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

Citing, Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Thus, Lin cannot serve as an anticipating reference and therefore the anticipation rejection of claims 1-4, 11-12 and 15 under 35 U.S.C. §102(e) is improper and should be withdrawn.

Next, the Patent Office rejects the remaining claims under 35 U.S.C. 103 as being unpatentable over Lin in view of U.S. Patent No. 6,720,630 (“Mandelman”) (claims 5-10), or Lin in view of U.S. Patent No. 6,297,172 (“Kashiwagi”) (claims 13-14), or Lin in view of U.S. Patent No. 6,320,238 (“Kizilyalli”) (claim 16), Lin in view of Kizilyalli in further in view of U.S. Patent No. 6,274,429 (“Misra”) (claims 17-18) or, finally, Lin in view of Mandelman, Kizilyalli and Misra.

In response, independent claims 1, 19 and 20 have all been amended to require the formation of the oxide films on sides of the gate pattern and not on the hard mask, which is formed on top of the gate pattern. This amendment effectively removes Lin as a base reference and the remaining references cannot be used to establish a *prima facie* case of obviousness.

Specifically, under MPEP §§ 2142 and 2143,

[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure.

Citing, In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); *see also* MPEP § 2143-§ 2143.03 for decisions pertinent to each of these criteria.

For the reasons stated above, Lin is deficient as a base reference because it does not teach or suggest the formation of a hard mask on a gate pattern or the formation of an oxide film on the sides of the gate pattern or conductive layer of a gate pattern. Thus, Lin is deficient as a base reference in at least two different respects.

None of the four other prior art references can be combined with Lin to establish a *prima facie* case of obviousness because no combination of Lin and the four secondary references teaches or suggests every claim limitation as required by MPEP §§2142 and 2143.

Specifically, Mandelman does not teach or suggest the formation of any oxide film on side walls of a gate pattern. Mandelman instead teaches the formation of a silicon nitride film 24 on an entire structure. Mandelman also does not teach or suggest the formation of a hard mask on a gate pattern. Mandelman instead teaches the formation of a dielectric layer 22. The layer 24 of Mandelman is a dielectric material and therefore also covers the dielectric layer 22 in addition to the entire structure. Therefore, Mandelman does not teach or suggest the formation of an oxide film on side walls of a gate pattern without covering a hard mask as required by each pending independent claim.

Accordingly, the obviousness rejection of claims 5-10 as being unpatentable over Lin in view of Mandelman is improper and should be withdrawn.

Next, the Patent Office rejects claims 13 and 14 as being unpatentable over Lin in view of Kashiwagi. However, Kashiwagi is not cited for the proposition that it teaches missing structures of the Lin reference but, instead, is merely cited for the proposition that it teaches plasma oxidation using oxygen and hydrogen. Thus, Kashiwagi cannot be combined with Lin to supplement the deficiencies of Lin as set forth above. Kashiwagi does not teach gate pattern, hard mask and oxide film structures and therefore the obviousness rejection based upon Lin and Kashiwagi of claims 13 and 14 is improper and should be withdrawn.

Next, the Patent Office rejections claim 16 as being unpatentable over Lin in view of Kizilyalli. However, Kizilyalli is not cited for the proposition that it teaches the missing structure of Lin. Instead, Kizilyalli is cited for the proposition that it teaches the use of ultraviolet rays to active ozone in a plasma oxidation process. Indeed, Kizilyalli does not teach or suggest a gate pattern, hard mask and side wall oxide film structure recited by the independent claims and therefore the obviousness rejection of claim 16 as being unpatentable over Lin in view of Kizilyalli is improper and should be withdrawn.

Next, claims 17 and 18 are rejected as being unpatentable over Lin, Kizilyalli and further in view of Misra. Kizilyalli is only cited for the proposition that it teaches the annealing of an oxide film in a nitrogen atmosphere and Misra is cited only for the proposition that it teaches an oxide annealing for a specified period of time. Neither Kizilyalli nor Misra teach or suggest a gate pattern, a hard mask form on a gate pattern and oxide films form only on side walls of the gate pattern as required by amended claim 1. Therefore, the obviousness rejection of claims 17-18 as being unpatentable over Lin, Kizilyalli and Misra is improper and should be withdrawn.

Finally, claims 19-20 stand rejected under 35 U.S.C. §103 as being unpatentable over Lin, Mandelman, Kizilyalli and Misra.

However, none of these four references teach or suggest the formation of oxide films only on side walls of a gate pattern and not on a hard mask formed on top of a gate pattern as required by amended claims 19 and 20. Therefore, no combination of these references teach or suggest at least two limitations of amended claims 19a and 20 and therefore, no hypothetical combination of these four references can render independent claims 19 or 20 obvious.

Because at least two limitations are entirely missing from any hypothetical combination of these four references, Applicants respectfully submit that the rejection of claims 19-20 as being unpatentable over Lin, Mandelman, Kizilyalli and Misra is improper and should be withdrawn.

An early action indication the allowability of this application is earnestly solicited.

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